

Claims:

1. A contaminated gas treatment apparatus comprising:
  - a first gas inlet for contaminant gas,
  - a second inlet for an oxygen source,
  - a heater compartment connected to the first gas inlet,
  - a heater in the heater compartment for heating the contaminant gas,
  - a heating region connected to the second inlet between an outside surface of the heater and heater compartment walls,
  - a cleaner mounted in the heater compartment and movable along the heater for cleaning particles from a heater surface,
  - a reaction region below the heater for mixing and reacting the oxygen and contaminant gases,
  - a filter chamber connected below the reaction region,
  - a filter in the filter chamber for filtering solid particulates from reacted gases, and
  - an exhaust connected to the filter chamber for removing reacted gas from the filter chamber.
2. The apparatus of claim 1, wherein the heater is a first heater and further comprising a second heater in the heater compartment and wherein the cleaner is movable along the length of and between the first and second heaters for cleaning particles from surfaces of the first and second heaters.
3. The apparatus of claim 2, wherein the first heater comprises an outer heater and the second heater comprises an inner heater and wherein the cleaner has an outer cleaning element for cleaning the outer heater and an inner cleaning element for cleaning the inner heater.

4. The apparatus of claim 3, further comprising an operator offset from a center of the treatment apparatus and connected eccentrically to the cleaner between the outer cleaning surface and the inner cleaning element for moving the cleaner between the outer heater and the inner heater.

5. The apparatus of claim 3, wherein the heater compartment is cylindrical, the outer heater is cylindrical and the inner heater is cylindrical, and wherein the cleaner is annular and coaxial with the outer heater and the inner heater, and further comprising an operator, offset from a center of the heater compartment and eccentrically connected to the cleaner, for moving the cleaner between the outer heater and the inner heater.

6. The apparatus of claim 5, wherein the operator further comprises a reciprocating air cylinder driver extending from an end of the treatment apparatus and a reciprocating rod extending into the heater compartment from the air cylinder driver and connected eccentrically to the annular cleaner for extending the rod in a space between the heaters as the reciprocating air cylinder moves the rod and the cleaner.

7. The apparatus of claim 5, wherein the cleaner is positioned above the first gas inlet and away from the passage of contaminant gases when not in use, and wherein the cleaner cleans entry points of the first gas inlet.

8. The apparatus of claim 5, wherein the outer heater has an inner liner with an extension beyond the outer heater, and wherein the outer cleaning element of the cleaner moves along the inner liner, and into the extension of the inner liner when the rod and the cleaner are fully extended through the heater compartment.

9. The apparatus of claim 5, wherein the second inlet is an air inlet, and wherein air flows between the outer surface of the heater and the heater compartment walls for performing dynamic

oxidation, and for cooling the outer surfaces of the heater.

10. The apparatus of claim 5, wherein the exhaust further comprises an exhaust chamber connected to the filter chamber and surrounding outer heater, and an exhaust outlet connected to the exhaust chamber for removing exhaust gases from the exhaust chamber, and water sprays in the exhaust chamber for cooling and scrubbing exhaust gases in the exhaust chamber.

11. The apparatus of claim 5, wherein the filter chamber is positioned below the heater compartment for removing solids out of the exhaust gas stream, and further comprising a quick disconnect clamp between a base of the heater compartment and a top of the filter chamber for removing the filter chamber and removing, replacing or cleaning the filter.

12. The apparatus of claim 1, further comprising a moisture injector connected to the first inlet or heater compartment for adding moisture as steam or water for reducing reactivity of contaminants and minimizing damage to the heater compartment and a remainder of the apparatus.

13. The apparatus of claim 1, wherein the first inlet further comprises up to four or more contaminant gas inlets.

14. A contaminated gas treatment apparatus comprising:

a first gas inlet for contaminant gas connected to a heater compartment,

a moisture injector connected to the first inlet or heater compartment for adding moisture as steam or water for reducing reactivity of contaminants and minimizing damage to the heater compartment and a remainder of the apparatus,

a heater compartment in the heater compartment for heating the contaminant gas,

a second inlet for an oxygen source connected to a region between an outer surface of the heater and an outer wall of the heater compartment,

a region below the heater for combining and reacting the oxygen and contaminant gas,  
a filter chamber connected to the heater compartment,  
a filter in the filter chamber for filtering solid particulates from reacted gas, and  
an exhaust connected to the filter chamber for removing reacted gas from the filter chamber treatment apparatus.

15. A contaminated gas treatment method comprising:

introducing contaminant gases through a first gas inlet connected to a heater compartment,  
providing a heater in the heater compartment for heating the contaminant gases in the heater compartment,  
introducing a stream of oxygen or air through a second inlet connected between an outer surface of the heater and a heater compartment wall,  
mixing and reacting the oxygen or air with the contaminant gases below the heater,  
filtering reacted gases through a filter in a filter chamber,  
exhausting the reacted gases through an exhaust connected to the filter chamber, and  
cleaning the heater with a cleaner mounted in the apparatus by moving a cleaner along the heater and cleaning particles from the heater.

16. The method of claim 15, wherein the heating comprises heating the contaminant gases between a first heater and a second heater in the heater compartment and wherein moving the cleaner comprises moving the cleaner along the first and second heaters for cleaning particles from the first and second heaters.

17. The method of claim 16, wherein the first heater comprises an outer heater and the second heater comprises an inner heater and wherein the cleaner has an outer surface for cleaning

the outer heater and an inner surface for cleaning the inner heater.

18. The method of claim 17, further comprising providing an operator offset from a center of the apparatus for moving the cleaner between the outer heater and the inner heater.

19. The method of claim 17, wherein the heater compartment is cylindrical, the outer heater is cylindrical, the inner heater is cylindrical and wherein the cleaner is annular and coaxial with the inner and outer heaters, and further comprising providing an operator offset from a center of the apparatus and moving the cleaner between the outer heater and the inner heater with the operator.

20. The method of claim 19, wherein providing the operator comprises providing a reciprocating air cylinder extending from an end of the treatment apparatus and extending a rod from the air cylinder into the heater compartment and connecting the rod eccentrically to the annular cleaner for extending the rod and moving the annular cleaner in a space between the heaters as the reciprocating air cylinder moves the cleaner.

21. The method of claim 15, further comprises positioning the cleaner above the first gas inlet and away from the passage of contaminant gases when not in use.

22. The method of claim 21, wherein moving the cleaner cleans entry points of the first gas inlet.

23. The method of claim 15, wherein the second inlet is an air inlet, and wherein airflow performs dynamic oxidation and cooling the outer surfaces of the outer heater.

24. The method of claim 15, further comprising cooling and scrubbing exhaust gases with water sprays in a water scrubbing zone before releasing the exhaust gas.

25. The method of claim 24, wherein the filtering removes solids from the reacted gases prior to entry into the water scrubbing zone.

26. The method of claim 15, further comprising connecting and removing the filter chamber with a quick disconnect clamp, located below the heater compartment, and removing replacing or cleaning the filter.

27. The method of claim 15, further comprising adding moisture as steam or water for reducing reactivity of the contaminant gas and minimizing damage to the first gas inlet heater compartment and other components.

28. The method of claim 15, wherein the providing of a first gas inlet further comprises providing up to four or more contaminant gas inlets.